Letter from Washington

For this issue of *NASA Activities* in 1982, I wanted to address all of you on what I believe is NASA's role, both now and in the future.

Basically, NASA's role will remain what it has been in the past—a continued balanced program in space exploration, manned space flight, aeronautics and applications. However, as to what level these activities will take place is a harder question. In real terms, in the last 10 years the NASA budget has decreased about 20 to 25 percent. The hope is that sometime in the next few years to get that downward trend turned up and instead of spending on the order of $6 or 6.5 billion, to spend the equivalent of about 5 years ago—about $7 or $7.5 billion, which gets us back to approximately one percent of the federal expenditure level.

Even considering OMB's budgetary targets, I believe this is a realistic expectation. A number of things have developed in the last two or three years that support this belief. One of these is an increased realization by the general public, as well as by specific constituencies, that the United States is not doing the necessary activity to maintain our technological lead in the world. I think the public perceives that the loss of competitiveness of American industry, and the decline in research and development expenditures in general, have resulted in foreign countries starting to move ahead of us. A further perception is that the Europeans and Japanese are somehow coming along faster than we are in accelerating their activities broadly in the research and development areas.

This perception translates into aiding NASA in its mission with the result that the NASA program, which happens to be the most visible research and development program in the federal government and in the country, has become more popular. Recent polls indicate that the majority of the public thinks what NASA's doing is proper and right, and that we should spend at least that amount of money on space research and technology development.

Moreover, a Harris Poll indicates that 40 percent of the public thinks we should be spending more—the highest percentage in the history of our agency—even in the halcyon days of Apollo, when NASA was very popular. So I believe that all of these things have convinced the public that perhaps we're not doing enough. And I believe this public realization represents a constituency.

I think that's a good sign because that usually transfers itself into politics. For example, a Presidential candidate in 1984 could give platform support for fiscal responsibility and control of the federal budget while also maintaining that research and development in the United States has been neglected and that the country should be spending more in this area, particularly as expressed in the space and aeronautics program. I think that would get a very positive response from the electorate.

In fact, this statement exists in the 1980 Republican platform. And I remind people in the Administration of this all the time.

The problem that this Administration is having is that the number one item on the agenda is cutting the federal budget. The feeling is that they can hardly cut food stamps and not cut, to some extent, the space program. It's as simple as that. That's the general rationale as to why we're getting cut along with everyone else.

The public perception that I would like to see corrected regards research and development abroad and the thought that the United States has lost its lead role in this competition. This is not entirely true and this is a very complex arena. In space foreign competition is very strong in communications and will increase in remote sensing, while the Europeans are spending only on the order of $1 to $1.5 billion on their space activities. However, they are focusing that expenditure in very specific areas, areas where they feel they can get substantial payoff: in the Ariane launcher program, the SPOT Earth resources spacecraft and in the communications satellite field, where they now compete worldwide.

Currently there are four countries out for bid on a communications satellite. Three of them are in Central and South America and the other one is Australia. In all four of these, the French and the Japanese are competing and they are competing very effectively with technology as good as ours and with prices as good as ours, including the usual extras such as better financing. The communications satellite field is the first place that they have moved into what has been a U.S. monopoly. In other areas, however, the United States clearly dominates the world—in space technology and aeronautics. We

also do well in cybernetics and in things like machine tools, but the industrial world is coming fast.

In other areas, however, we are losing ground as well, and it's because foreign nations are focusing their efforts in areas where they see a fairly sizeable commercial payoff. It is true that almost all of that is building upon foundations laid by NASA over the past couple of decades, which is of scant solace. You could make a sweeping generalization which, like all generalizations, is probably wrong—that the whole Japanese economy is based on American technology But they have taken that technology and moved it forward to make a very effective, highly competitive economy, one which has resulted in a vast increase in their standard of living and has resulted in an enormous competitive posture with the rest of the world.

As an open society, the United States publishes almost everything we do. Japan can use our technology; indeed, we have given it to them. In the past we went around the world passing off these very valuable gifts, like license-free use of all NASA technology.

This in turn raises a related question: When does NASA research and development become ready for commercial utilization? How and who makes the decision and at what stage does this transfer happen?

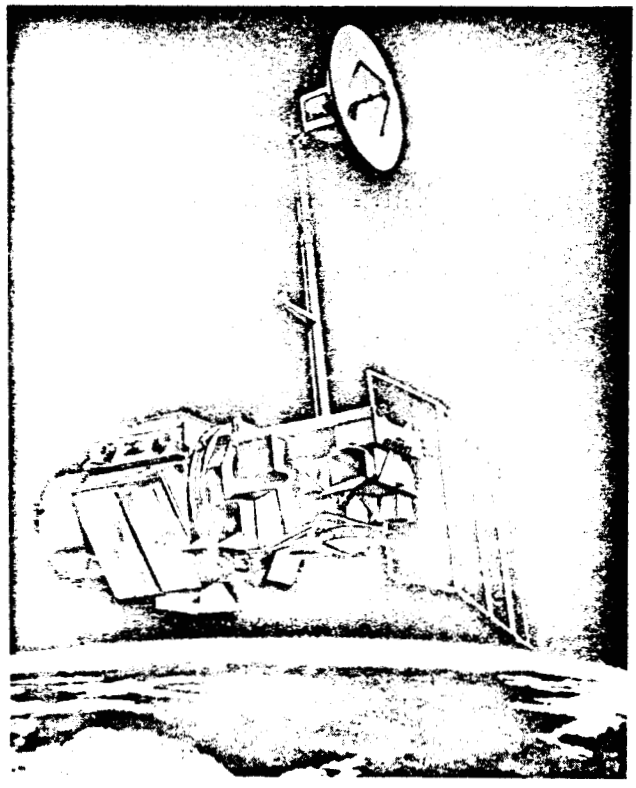
I've spent most of my life in business and timing of commercialization is the most difficult thing in the world to determine. The analog in the business world is the translation of technology into a new product and the marketing of that product. The problem is that "we" (meaning the country) don't know how to do that very well. The manifestation of that problem is some 80 or 90 percent of all new products fail in the commercial world. We have tried a lot of ways to improve that percentage: test market techniques, market studies, research as to requirements and needs and so forth. We must try to do the same thing here in NASA applications.

Landsat, as a current example, is something in which there was a lot of thought by NASA as to its potential commercial fallout. The conclusion was that there was a market, and indeed there is a market without any question. Is it a commercially viable market though? This is the second question you must ask yourselves. The problem is that a big part of the market are individuals who wouldn't otherwise pay the full cost of the data.

The largest Landsat user is the government. The other part of the market are commercial users. In their case they want, to some degree, confidentiality in the data they obtain. It's both a necessity and a hard requirement for most of them because, if they're going to use the data, for example in drilling a well, or in trying to exploit a natural resource, or for estimating crop yield, the large commercial users would like to be sure that that data is known only to them, since they must make very large investments.

To translate technology like Landsat into commercial reality, I believe we must rely on the entrepreneur, because this is the person who must decide whether a market can be developed around a specific system. Typically, we in the government are not very good entrepreneurs. NASA is very good at doing the basic research and understanding the system aspects. When it comes to trying to figure out whether there's a market or not, we don't do that very well.

And if you're going to attract entrepreneurs in the field then you've got to give them a fairly broad license to do with the system almost what they will. He's taking the risk; he's going out and raising the venture capital, and the government should encourage this process. The trouble with that is that it may turn out in a much different way than you expect, and you may not like the results. When you



Artist's concept of Landsat-D to be launched July 1982.

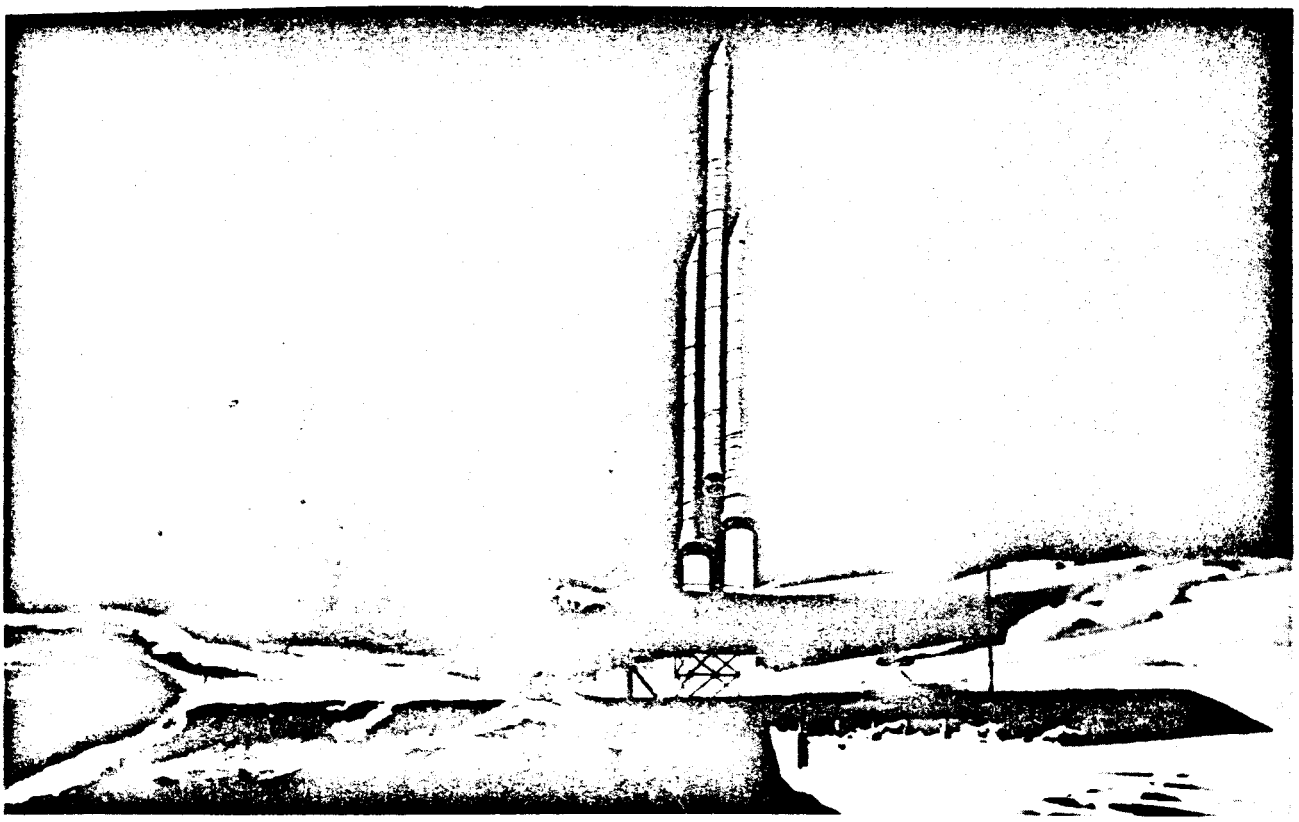
don't like the result, the only answer is to pass another law, hoping to enforce market sharing.

This, of course, would tend to make future entrepreneurs wary. That's why a lot of entrepreneurs are scared to death of the government anyway. In order to allay their fears we must encourage the private sector by easing regulation and control. For example, there are several bills before Congress right now on patent rights which I heartily support. If enacted, when a contractor develops a patent under government funding, royalty-free rights to develop this patent are granted. The only exception is that royalty-free rights also must be guaranteed to the government if the government wants to exercise this privilege, since the patent was developed with federal money.

The opposing view holds that it is the government money that provides the seed funding to get that idea into the public domain. And this is true. But it is also true that the patent is exploited and this creates economic activity that in turn benefits the nation. It also directly benefits Uncle Sam through taxes on the profits made from the commercialization.

All of this leads to the basic conclusion that if Congress wants to have a faster spinoff of the applications work NASA does, a broad statute must be written that provides a method of getting that application to the private sector which, in turn, will bring it into commercial reality. The government, of course, should retain royalty-free use of the data.

Next, I would like to address NASA's role for space science over the next decade. Most of you have read in various articles that NASA has very few programs planned for the future and, moreover, this program area is an easy target for budget cutters, despite public and Congressional support. The planned programs we have, in fact, are as much as



New Rocket Concept—Under study at NASA's Marshall Space Flight Center, Huntsville, Ala., is an unmanned launch vehicle called the SRB-X, which would be developed primarily from recoverable Space Shuttle components. In a "mixed fleet" concept which NASA is considering, the SRB-X would be used to augment Shuttle flights when payload space is not immediately available in the Orbiter. The "SRB" refers to the Solid Rocket Booster, that part of the Shuttle system which provides primary thrust at launch and falls back to Earth for recovery. In this artist's concept, a three-rocket SRB-X configuration lifts off to carry as much as 65,000 pounds of cargo into low Earth orbit. The payload would be located at the top of the center rocket, and after the payload was inserted into orbit the solid rocket boosters would fall back to Earth to be used once again.

we currently can afford. I would like to do a lot more. But interestingly, and I've been staring at budget numbers here for the last couple of months, if you look at percentages and forget about the absolute amount, space science has been getting about the same percentage of the budget since the Apollo days.

Now the problem is, from the point of view of real resources, that is a declining number. The figures as they work out reveal a steady-state condition if you go back to 1972, the completion of our Apollo expenditures. We were spending a budget for a core program—on the order of $3.3 to $3.4 billion in 1971 or 1972 dollars. Escalating that into 1982 dollars equals $7.5 billion. Congress now is ready to enact a NASA budget of $6 billion, $1½ billion short of a steady-state core program. That's the reason the space science share of the total budget is a lot less than they were obtaining in 1972, and that hurts.

If the NASA budget is cut further, and I trust it won't be, we would definitely have to cut into the space science program, because there is no other place to cut. Our endeavor over the next five years is to get back to a NASA budget that is a little closer to the one percent of government expenditures. That's a percentage I think is reasonable and not greedy for this agency.

To achieve this, NASA needs a new major goal to provide the program of technology which stimulates so much spinoff. The reason I and the Deputy Administrator (Hans Mark) have emphasized a space station as such a goal follows naturally in the Shuttle program—the program envisioned was not only transportation but a total system. The space shuttle provides the ability to carry a lot of weight up and a revisit capability. This ability leads you to start thinking of applications which require large structures, antenna systems, materials processing systems, or large systems with potential for power generation.

When you start talking about large structures, you've got to carry them up in pieces and put them together in orbit. And when you start to examine how you're going to do that, you really need a base; hence a space station. Once you're there, then you can start dreaming even bigger dreams.

In contemplating these possibilities, you can start seeing a huge system involving manned activity in using the three planet system of the Earth, Moon and Mars. Now you're out to the year 2050 or something like that, but you've got a continuing series of objectives set, each of which leads logically to the next. And such an expansive program of manned activity will not draw away from the space sciences. There is still a long list of initiatives that we would like to achieve in space science. And when you get to the point of having the space station and the ensuing capability of doing things in space, then a lot of that science becomes easier to obtain. The system becomes more logical in terms of what you have to do in order to launch the platforms to the place you want.

I do not believe that the future of space shuttle operations necessitates a split between military and civilian shuttles. However, if the Air Force feels in any way that it needs a degree of control that they feel they don't have, I'd be perfectly willing to give it to them for their flights. But I would object very much to splitting the fleet. I think that there's a lot of advantages to keeping the fleet together, both operational, economic and from the point of view of the improvement of the system as we go along. The flight rate that the Air Force is talking about is relatively low, and there's no reason why we can't draw key people out of Kennedy to assist them.

We will need five orbiters to effectively carry out the productive utilization of space. Sooner or later we will have operational failure and need back up vehicles standing by when we reach a high flight rate per year.

In the long-term, NASA is not an operating agency. That troubles people when you look at the rate of shuttle activity that may develop: 25 or 30 flights a year, flying 2 or 3 times a month. A flight rate of that magnitude is a large operational responsibility. My experience in the federal government tells me that agencies with large operational responsibilities inevitably neglect their research and development responsibilities. Operational responsibilities are day to day. You've got to pay attention to them which necessitates devoting less and less time to research and development.

So in the future, when the shuttle achieves full operational capability, it will be something that can be spun off into either some kind of quasi-public/private corporation or operate as a profit-making enterprise.

As always, our goal must be to keep our constituency behind America's space program. We need this support to achieve our present and long range goals.

Note: This speech was taken from a recent interview given by NASA Administrator James M. Beggs to Dr. Mark Chartrand and Leonard David from the National Space Institute. The interview appeared in the Institute's November/December edition of *Insight* magazine.